teachings, and the student is led to rely on the authority of the teacher rather than on any process of reasoning; of such works we must sadly confess "the trail of the examiner is over them all."

But for those who would learn to love geology for itself, Prof. Cole has supplied a charming, and at the same time trustworthy, introduction to the science. He has wisely adopted what may be called "the recapitulation method" of teaching, that is to say, he introduces new facts and ideas in the order and by the reasonings through which they were originally discovered, and by which the present position of the science has been gradually attained; knowledge is made to grow in the individual mind along the same lines as it can be shown to have done, though far more slowly, in the history of our race. It is needless to add that such a mode of presentation must be, to a great extent, biographical.

After some preliminary considerations, the author shows, in the first place, the steps by which William Smith, "the father of English geology," was led to his epoch-making discoveries of a stratigraphical succession, based on the evidence of fossils. Then turning from southern England to the Paris Basin, the labours of Lamarck and Deshayes, of Cuvier and Brongniart are indicated as affording useful aids to Charles Lyell in proving that, in the latest formed geological deposits, life-forms gradually replaced one another, thus lending support to the more general conclusion that the same continuity becomes manifest, as we trace the succession to the remotest past.

In succeeding chapters, the effects of running water, as taught by Hutton, and of moving ice, as shown by Agassiz, are well described, with illustrations drawn from the author's own observations and those of his contemporaries. "The Throat of a Volcano," "The Giant's Causeway," "The Making of Mountains," and "A Year of Earth Storms," are the headings of other chapters of this entertaining and instructive book, in which the labours of the pioneers of research are in all cases described with warm sympathy and just discrimination. The numerous illustrations of the book are, for the most part, from photographs taken by the author, and if any further evidence were needed that his descriptions are based on actual visits to the districts, it will be found in many a picturesque phrase. The hardest working college student, no less than the general reader, will find it an advantage to peruse this bright little book, for he can scarcely fail to catch some sparks of the enthusiasm of the author, which glows on every page.

J. W. J.

BANTU MYSTICISM.

Notes on West African Categories. By R. E. Dennett. Pp. xi+68. (London: Macmillan and Co., Ltd., 1911.) Price 1*s.* net.

IN this small book or enlarged pamphlet, Mr. R. E. Dennett recurs to his theories regarding formulæ, religious categories, and transcendental symbolism which he has believed himself able to trace in the employment of prefixes and word roots, more especially amongst the Bavili, a Congolese tribe of the Loango coast, and also in a lesser degree amongst the Yoruba and Bini peoples of the Niger Delta.

Mr. Dennett cannot fail to write interestingly on any African subject with which he is personally acquainted, since whether one agrees or not with his theories one is certain to find new and true facts in his compilations. But the reviewer is still quite unable to endorse from his own experience the probability that the Bavili (more especially) could have developed such an elaborate mathematical cosmogony and theology as Mr. Dennett places to their credit, and bases on the forms of their prefixes and of their word roots. As happens all too often, to the sorrow of the universal student of Bantu languages, Mr. Dennett has made a study of one particular Bantu dialect and deduces from his study theories which fall to pieces directly one compares that dialect with another of the same group, or one Bantu language with another. He strives to show that in the minds of this particular coast Congo people certain great categories of thought exist. For instance, he would devise a category which should contain four visible and four invisible parts, or another which should range from 0 to 9, and should correspond with certain classes of Bantu prefixes; and again others which correspond with ideas of God, the procreation of the human species, abstract qualities, such as receptivity, originality, order, manner, action, quality, &c.

To anyone who knows the negro as well as the present reviewer may claim to do, much of this appears impossibly fantastic and unreal; and when such theories are based on a misunderstanding (sometimes) of the original form and purport of prefixes in tongues closely related to the Bavili and similar correspondence of word roots, they reduce one to something like despair; for Mr. Dennett, who, as regards his recorded facts, is often so accurate and so helpful to students of Africa, wastes his time and thoughts on prolix theories which seem to be devoid of any scientific foundation. If, as he says in the beginning of his book, he has won over that notable student of the Bantu tongues, Miss Alice Werner, to a belief in, or even a toleration of, his theories given in "At the Back of the Black Man's Mind" and in the present pamphlet, it can only be deeply regretted that both of them should be following a will-o'-the-wisp. This opinion, most regretfully written, does not prevent "Notes on West African Categories" from being a work of considerable interest, and containing many new observations of value which seem to the reviewer perfectly sound as statements of fact.

THE VOICE OF LYELL.

The Student's Lyell: the Principles and Methods of Geology, as applied to the Investigation of the Past History of the Earth and its Inhabitants, with Historical Introduction. Edited by Prof. J. W. Judd, C.B., F.R.S. Second edition, revised and enlarged. Pp. 645. (London: J. Murray, 1911.) Price 7*s.* 6*d.* net.

IT is most fitting that the revision of Lyell's "Students' Elements of Geology" should be again carried out by Prof. J. W. Judd, who brings

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to his work such intimate knowledge of Lyell himself, and such broad experience as a geological teacher. Prof. Judd's pupils in many lands will find again in this volume those stimulating memories of Lyell's life and work which they received from their own master in the Royal School of Mines. The "historical introduction" to the present edition, occupying fifty-six pages, is not only a welcome essay on the influence exerted by the doctrine of causes now in action, but also a defence (pp 49–52) of Lyell from the charge of excessive uniformitarianism. Those who have not made themselves acquainted, as Prof. Judd has done, with the extravagant speculations of geological divines and of laymen aspiring to divinity, before the days when the influence of Hutton, von Hoff, and Lyell came to be generally appreciated, can scarcely realise the sense of calm and order that was brought by these authors into a world of controversy. Charles Darwin's admiration for the "Principles of Geology" would alone assure us of Lyell's position as a thinker; and now, in turning the pages of this new issue of his admirable text-book, we are again reminded that here was a man who wrote because, and only because, the spirit moved him.

The refined woodcuts are here that we first knew in 1871. Drawings of such modernities as radiolarian ooze and thin sections of rocks have been introduced, and toothed birds and other American vertebrates are illustrated; but the view of geology remains, in the hands of so sympathetic an editor, essentially that of Lyell in his habit as he lived. We look back into the past from our experience of the present; a pleasant emphasis is laid upon the Tertiary strata throughout Europe; and the work reminds us in so many places of the history of geological thought that it still stands apart from any other text-book.

Supplementary notes have been added (pp. 601 to 610) directing attention to many recent discoveries, and these, in so limited a compass, naturally provide food for thought rather than a complete exposition. We miss a reference to the older glacial epochs; the stratigraphical breaks indicated in the diagram on p. 441 surely exaggerate enormously the imperfection of the European record; and many geologists would like to expand the modest view of contact-metamorphism stated on p. 553. It is easy to comment on details where so wide a range of subjects has been dealt with. The essential feature is that the editor has handed on to us undimmed the lantern lit by Lyell.

G. A. J. C.

MODERN KNOWLEDGE HANDBOOKS.

(1) *Polar Exploration.* By Dr. W. S. Bruce. Pp. 256.
(2) *The Evolution of Plants.* By Dr. D. H. Scott, F.R.S. Pp. 256.
(3) *Modern Geography.* By Dr. M. I. Newbigin. Pp. 256.
(Home University Library of Modern Knowledge.) (London: Williams and Norgate, n.d.) Price 1*s.* net each.

THE three volumes the titles of which are given above belong to the Home University Library of Modern Knowledge, published by Messrs. Williams and Norgate under the editorship of Prof. Murray, Mr. Herbert Fisher, and Prof. J. Arthur Thomson. Each is intended to be a concise handbook to the subject with which it deals, and by an acknowledged authority. The object of the series is to place within everyone's reach, at the lowest possible price, authoritative information on any branch of history, science, art, literature, philosophy, or religion with which he desires to become acquainted. Ten volumes will be issued each year. The first on our list, "Polar Exploration," by Dr. Bruce, is what the author has termed a "traveller's sample" of the Arctic and Antarctic warehouses. No one is more competent to present their contents than one who has personally sampled as he has done, more than once, both polar regions, and has besides learned much in regard to them from personal conversations and correspondence during the past twenty years with living polar explorers, including the veteran Sir Joseph Hooker, to whom the volume is dedicated. The personal note predominates, as it needs must, and those parts visited by the author are dealt with in greater detail than those which he has not had an opportunity of visiting. The aspects of the subject dealt with in the present volume are the astronomical features of the polar regions; the ice, both land and sea, its coloration and that of snow; the vegetation, the animal life and the physics of these regions; their meteorology, magnetism, aurora, and tides, with a final chapter on the aims and objects of modern polar exploration. Not the least important addition to the physics of the southern seas made by the Scottish national Antarctic expedition was the discovery of the existence of a long "rise" extending in a curve from Madagascar *via* Bouvet Island, the Sandwich group, the South Orkneys, Graham Land, and the Falklands to South America. "Thus Antarctica, South America, and Madagascar and probably South Africa become connected with one another in a most direct manner by this rise." The volume smacks of a Stevensonian voyage.

(2) "The Evolution of Plants" is a masterly *résumé* of this extremely difficult subject by one of our highest authorities, himself a leading investigator in palæobotany. Dr. Scott's object in this book is to try to trace historically the course which the evolution of plants has actually followed, confining himself to those groups for which the evidence is most satisfactory. The questions here considered are: the evolution of true-flowering plants; that of the seed-plants generally; and, thirdly, that of the great groups of the higher cryptogams, or spore-plants, the ferns, the club mosses, the horsetails and sphenophylls. Dr. Scott's work "needs no bush."

(3) Dr. Marion Newbigin dates the commencement of "modern geography" only from 1859, the year when the celebrated geographers Humboldt and Ritter died and Darwin's "Origin" appeared. The doctrine of evolution has had an enormous effect on geographical science, and its development has been so great that to give a complete survey of the subject would be impossible. Her volume, "Modern Geography," therefore, suggests only some of the

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